TETRA TECH

May 4, 2021

Mr. Kevin Clark
On-Scene Coordinator
U.S. Environmental Protection Agency, Region 3
1650 Arch Street
Philadelphia, Pennsylvania 19103

Subject: **Limited Evaluation Report, Revision 0**
Shiloh Church Road Removal Site
EPA Contract No. 68-HE-0320-D0003
Technical Direction (TD) No. T601-21-03-003
Document Tracking No. 0168

Dear Mr. Clark:

Tetra Tech, Inc. (Tetra Tech) is submitting the enclosed Draft Limited Evaluation Report – Revision 0 for the Shiloh Church Road Removal site in Nathalie, Halifax County, Virginia for your review and approval. This plan presents the engineering evaluation for placing a concrete cap over contaminated soils to minimize infiltration and limit future land usage.

If you have any questions regarding this plan, please contact me at Non-responsive due to revised scope or via e-mail at Non-responsive due to revised scope

Sincerely,

Non-responsive due to revised scope
Environmental Engineer

Enclosure (1)

cc: TD file
Non-responsive due to revised scope, Tetra Tech

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TITLE AND APPROVAL PAGE

DRAFT LIMITED EVAULATION REPORT
SHILOH CHURCH ROAD SITE
NATHALIE, HALIFAX COUNTY, VIRGINIA

REVISION 0

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Superfund and Emergency Management Division
Region 3
1650 Arch Street
Philadelphia, Pennsylvania 19103

TECHNICAL DIRECTION NO.	T601-21-03-003	
EPA ON-SCENE COORDINATOR	Kevin Clark	
SITE NAME	Shiloh Church Road Removal Site	
SITE LOCATION	Nathalie, Halifax County, Virginia	
LIMITED EVALUATION REPORT PREPARER	Non-responsive due to revised scope	
SIGNATURE/DATE	Non-responsive due to revised scop	5/4/21
QUALITY ASSURANCE OFFICER	Non-responsive due to revised scope	
SIGNATURE/DATE	Non-responsive due to revised scope	5/4/21
EPA OSC APPROVAL SIGNATURE/DATE		
EPA REGION 3 APPLIED SCIENCE AND QUALITY ASSURANCE BRANCH (ASQAB) DELEGATED APPROVING OFFICIAL SIGNATURE/DATE		
DOCUMENT TRACKING NO.	**0128**	

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APPENDIX

1.0 INTRODUCTION

Under Superfund Technical Assessment and Response Team (START) Contract No. 68-HE-0320-D0003, Technical Direction (TD) No. T601-21-03-003, U.S. Environmental Protection Agency (EPA) Region 3 tasked Tetra Tech, Inc. (Tetra Tech) to develop a Limited Evaluation Report for the former drum area of the Shiloh Church Road Removal Site (the site). The EPA wishes to limit future land use of the drum area by means of a concrete slab cover. EPA's objective for placing the concrete cover is to: prevent land disturbing activities from occurring within the contaminated subsurface; minimize stormwater infiltration; and possibly serve as vehicle storage for the current homeowner. The cover is not intended to provide load bearing structural support.

2.0 SITE BACKGROUND

This section presents the site location and description and summarizes the site's history.

2.1 Site Location and Description

The site is located in a rural area, at the intersection of L.P. Bailey Memorial Highway (U.S. Route 501) and Shiloh Church Road (Virginia State Route 626) in Nathalie, Halifax County, Virginia (Figure 1). The approximate geographic coordinates of Shiloh Church Road, a public thoroughfare that traverses the center of the site, are 36.9699° north latitude and 78.9807° west longitude. The site is bounded to the west by L. P. Bailey Memorial Highway. The site is surrounded by several residential properties, undeveloped woodlands, agricultural fields, and an orchard. Nathalie, Virginia, has a population of approximately 183 people (2010 census).

The Shiloh Church Road site consists of three properties where hazardous substances were deposited, possibly as a result of salvage yard operations.

2.2 Site History

A Phase II Environmental Site Assessment (ESA) was completed in January 2018 by Hurt & Proffit on behalf of the property owner to determine potential environmental liabilities prior to a future transfer in ownership. In addition to PCBs detected in soils, the Phase II ESA Executive Summary also noted elevated concentrations of petroleum, chlorinated solvent constituents, and metals. Hurt & Proffit recommended notifying EPA Region 3 and the appropriate Virginia Department of Environmental Quality (VADEQ) regulatory agencies of these exceedances (Hurt & Proffit, 2018). VADEQ requested EPA perform an expanded removal site assessment.

In May 2018, EPA performed a removal site evaluation in accordance with 40 Code of Federal Regulations (CFR) Section 300.410. The removal site evaluation determined a release of hazardous substances had occurred and the site presented an imminent and substantial threat to the human health and environment. A removal action began at the site in 2019 and included:

1. Segregation of radiation discrete items
2. Excavation of contaminated soil
3. Windrowing and treating contaminated soil with a stabilization product to minimize leachability of lead and cadmium prior to soil disposal
4. Installation of water treatment systems on residential wells with elevated concentrations of hazardous substances

Discrete items with detectable radiation were consolidated and disposed separately. Stabilized soil was sampled prior to transport offsite to ensure concentrations of lead and cadmium were below Resource Conservation and Recovery Act (RCRA) regulatory levels for disposal.

2.3 Area of Concern

In the northern portion of the contaminated area (Figure 2), drums were encountered during assessment and excavation of contaminated materials. The drums were excavated and removed from the area. However, the vertical extent of contamination in this area was determined to be too deep for removal of the contaminated soils by excavation. The excavation was backfilled with unclassified fill from other areas of the site. It is Tetra Tech's understanding that the fill was not placed in engineered compacted lifts.

3.0 SUBSURFACE CONDITIONS

3.1 Site Conditions

The site is generally flat and clear of vegetation except for some small grassy areas. There is evidence of garbage consisting of old fabrics, plastics, and automotive battery casings on the surface.

3.2 Subsurface Investigation

On April 8, 2021, three test pits were excavated to depths of approximately 18- to 36-inches below ground surface. The test pits were advanced at the southern end, the approximate center, and the northern end of the drum area. The test pits were advanced using a tracked excavator and were overseen by a representative of Tetra Tech.

3.3 Subsurface Conditions

The area is overlain with approximately 6- to 12-inches of dry to wet, brown, silty sand containing a few cobbles and miscellaneous debris. The debris consists of battery casings, plastic, and steel wheel rims. The test pit at the southern end (TP-1) contained an unknown viscous material approximately 4-inches below ground surface.

Underlying the surficial material moist, red clay extends to the depth of the excavation. The clay exhibited odor and staining consistent with solvent contamination or similar.

4.0 CONCRETE SURFACE COVER

4.1 Surface Preparation

Tetra Tech recommends that the surface of the area be compacted prior to concrete placement. To maximize the lifespan of the concrete cover, the silty sand layer containing the debris should be removed from the cover footprint. The unknown viscous material encountered in TP-1 should be completely removed to its horizontal and vertical extents. The bottom of the excavation should be compacted and proof-rolled prior to placement of any engineered fill or concrete.

If the EPA wishes to construct the concrete cover without excavating any materials, then the surface of the cover area should be compacted with a minimum 15-ton sheepsfoot roller to increase compaction depth of the underlying soils.

4.2 Engineered Fill

To provide a consistent construction surface and support for the concrete cover, approximately 12-inches of engineered fill should be placed under the area for the proposed concrete cover. The engineered fill should be free of organic material, topsoil, debris, and gravel greater than 3-inches in their largest dimension. Imported engineered fill should be a graded aggregate base course (GABC) meeting the material and gradation requirements of Virginia DOT Type II. When placed, the engineered fill should be compacted to at least 95% of its maximum dry density as determined by ASTM D1557 Modified Proctor Test.

Tetra Tech recommends placement of a non-woven geotextile fabric (Geotex 601 or equivalent) between the GABC and prepared subgrade. This geotextile would serve as a separator between the base course

aggregate and the subgrade to maintain the integrity of the base course aggregate and reduce slab maintenance costs. The fabric should be placed in a stretched (unwrinkled) state, directly over the prepared and reviewed subgrade.

4.3 Low-Permeability and Drainage Layers (at EPA Discretion)

Over the course of its lifetime, the concrete cover will most likely experience cracking. It is common for shrinkage cracks to occur in the short-term. The slab will be positioned over non-engineered backfill soils (i.e., uncompacted soils from historic drum removal activities) and these soils can cause differential settlement below the slab, potentially causing additional cracks in the concrete cover in the long-term. Presence of cracks could allow stormwater to infiltrate into the subsurface contaminated soils, which could draw contaminates down to groundwater. The volume of infiltrated water would likely be small and may be considered insignificant.

At EPA's discretion, mitigation for surface water infiltration could include placement of a low-permeable geosynthetic layer below the engineered fill layer. The impermeable layer can consist of either a geomembrane or a geosynthetic clay liner (GCL). A GCL may be more suitable because it is less labor intensive, has the unique ability to resist punctures from underlying soils/gravel, and have self-seam overlaps. A GCL is comprised of two geotextiles that are needle-punched together, encapsulating a layer of sodium bentonite clay between them. It is known for having consistent, very low permeability. A GCL would not act as a suitable vapor barrier until a sufficient volume of surface water had infiltrated to hydrate the bentonite. Using a geomembrane would be a more suitable vapor barrier. If a geomembrane is used, a layer of non-woven geotextile should be placed directly below the geomembrane to protect against puncture from the underlying subgrade soils/gravel.

Placement of a low permeability layer may dictate a need to drain any infiltrated surface water off the layer, so water does not buildup and cause detrimental freeze-thaw effects to the concrete cover. This can be accomplished by placement of a geocomposite drainage layer. A geocomposite drainage layer is comprised of a thin geonet core, with a non-woven geotextile heat bonded to the top of the geonet. The geocomposite layer should be daylighted at the perimeter of the concrete pad, so that any water caught within the drainage layer is conveyed to the perimeter and away from the pad.

If a low-permeable layer and drainage layer is selected for installation, the soil subgrade will need to be graded in a way that provides positive gravity flow of captured surface water to the perimeter of the concrete cover in order to discharge to surrounding surfaces. In addition, if these layers are installed, the non-woven geotextile below the engineered fill layer (described in Section 4.2) would not be needed.

4.4 Concrete Cover

If the concrete cover will be used solely to limit future use of the area, the concrete cover can be constructed with a minimum thickness of 6-inches with a minimum compressive strength of 3,000 psi. The concrete mix should be air-entrained and wire reinforcement should be utilized to provide tensile strength to minimize cracking within the slab.

The EPA discussed the potential use of the slab cover with a cloth canopy for vehicle storage with the homeowner. If vehicle loads are intended for the concrete, Tetra Tech recommends that the minimum compressive strength of the concrete be increased to 4,000 psi and fiber reinforcement (micro-fibers) be added to the concrete mix in addition to the wire mesh reinforcement.

The concrete cover should be slightly sloped to provide proper run-off of stormwater off and away from the slab. Control joints are recommended within the concrete slab, to be placed at maximum 12-foot intervals in approximately square panels, where possible. The control joints would provide preferential locations for potential cracking of the concrete.

All concrete construction should accord with American Concrete Institute (ACI) guidelines and should be performed by an experienced concrete contractor.

Maintenance of the concrete cover should be anticipated over time (e.g., epoxy caulking of cracks that can occur in concrete). It should be noted that hair-line cracks are not uncommon in concrete slabs.

Once the EPA determines their final course of action, Tetra Tech can provide material specifications and provide more detailed designs for the concrete and geosynthetic materials.

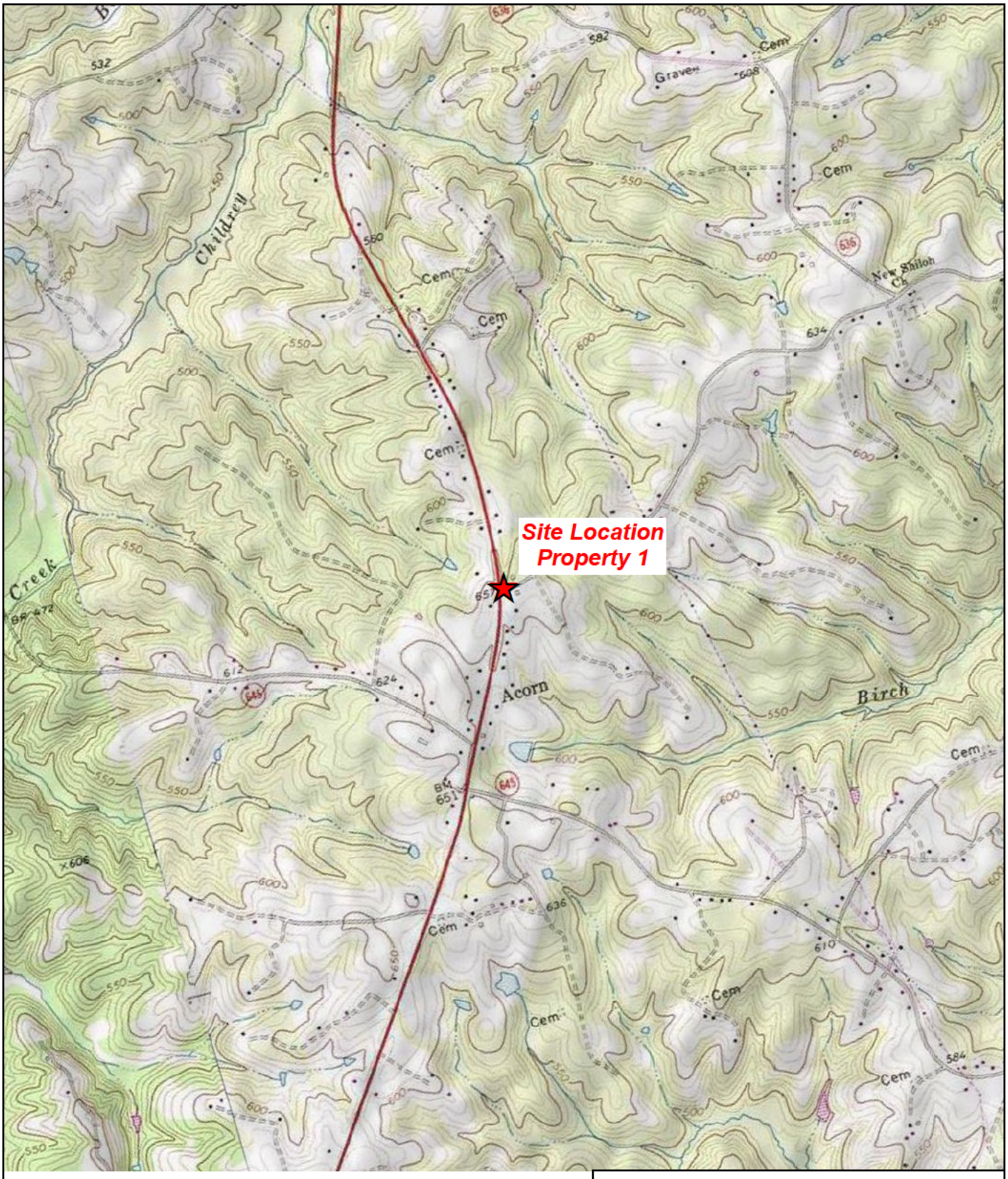
5.0 QUALITY CONTROL

A qualified geotechnical technician working under the supervision of a geotechnical engineer should monitor all site excavations, proof-rolling, fill placement, geosynthetic installations, and concrete construction. The technician should observe and document site preparation, proof-rolling, engineered fill construction, soil subgrades, and slab construction; and should conduct appropriate field tests to verify that construction proceeds in accordance with acceptable construction practices, as necessary. Tetra Tech can provide these services. Conclusions and recommendations in this report are based on the premise of competent field engineering and monitoring during construction.

APPENDIX A

FIGURES

1 Site Location Map
2 Site Layout Map



Source: USGS Nathalie, VA 7.5 Minute Topo Quad, 1976

Shiloh Church Road - Limited Evaluation Report
Halifax County Virginia

Figure 1
Site Location Map

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Date 4/29/2021 Drawn By Non-responsive Project No 9034012103003

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Legend

2019 Removal Action Area (Property 1)

Area of Concern

N

0 60 120

Feet

Source: The source of the imagery is ESRI, used by the EPA with ESRI's permission.

Shiloh Church Road - Limited Evaluation Report
Halifax County Virginia

Figure 2
Site Layout Map

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Date 9/29/2021 Drawn By Non-responsive Project No 9034012103003

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